

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (currently amended) A liquid crystal projector, comprising:

a light source;

an optical element for changing the light from said light source into a parallel light, to be divided into three (3) light beams;

three (3) kinds of liquid crystal panels for transmitting the three (3) light beams divided by said optical element therethrough, so as to modulate intensity thereof;

an optical synthesizing means for synthesizing the three (3) light beams, passing through said three (3) kinds of liquid crystal panels, to be modulate intensity thereof;

a projection means for projecting the three (3) light beams, which are synthesized by said optical synthesizing means; and

a closed loop liquid cooling cycle, including a pump and a radiator therein, for circulating a liquid coolant within and through said three (3) kinds of liquid crystal panels, so as to conduct cooling thereof, wherein

each of said three (3) kinds of liquid crystal panels defines a flow channel therethrough for the liquid coolant circulating between a surface of said liquid crystal panel and a transparent member to be disposed opposing thereto, respectively, and further, said flow channel includes a high-resistance flow channel being flat and uniform in thickness thereof, covering a liquid crystal panel area of said liquid crystal panel, and also a buffer portion defined neighboring to [[a]] one of an upstream side and a downstream side of said high-resistance flow channel, said buffer portion being coupled to one of an inlet and outlet of the liquid crystal panel for the liquid coolant circulating therethrough, and to the pump and and to the radiator to form the

closed loop liquid cooling cycle.

2. (withdrawn) A liquid crystal projector, comprising:

a light source;

an optical element for changing the light from said light source into a parallel light, to be divided into three (3) light beams;

three (3) kinds of liquid crystal panels for transmitting the three (3) light beams divided by said optical element therethrough, so as to modulate intensity thereof;

an optical synthesizing means for synthesizing the three (3) light beams, passing through said three (3) kinds of liquid crystal panels, to be modulate intensity thereof;

a projection means for projecting the three (3) light beams, which are synthesized by said optical synthesizing means; and

a liquid cooling cycle, including a pump and a radiator therein, for circulating a liquid coolant within said three (3) kinds of liquid crystal panels, so as to conduct cooling thereof, wherein

each of said three (3) kinds of liquid crystal panels defines a flow channel for the liquid coolant with a surface of said liquid crystal panel and a transparent member to be disposed opposing thereto, respectively, and further, said flow channel includes a high-resistance flow channel being flat and uniform in thickness thereof, covering a liquid crystal panel area of said liquid crystal panel, and also an auxiliary flow channel lower in flow resistance than said high-resistance flow channel, being defined surrounding said high-resistance flow channel.

3. (currently amended) A liquid crystal panel for use in a liquid crystal projector in which a pump and a radiator enables circulation of a liquid coolant within and through the liquid crystal panel in a closed loop liquid cooling cycle, comprising:

two (2) pieces of transparent substrates, enclosing a liquid crystal between them; and further

at ~~least~~least a transparent plate, being disposed opposing to one surface of said two (2) pieces of transparent substrates, so as to define a flow channel for [[a]] the liquid coolant circulating between them, wherein

said flow channel defines a high-resistance flow channel being flat and uniform in thickness thereof, and further comprises a buffer portion neighboring to [[a]] one of an upstream side and a downstream side of said high-resistance flow channel, said buffer portion being coupled to one of an inlet and outlet of the liquid crystal panel for the liquid coolant circulating through the liquid crystal panel, and to the pump and to the radiator to form the closed loop liquid cooling cycle.

4. (withdrawn) A liquid crystal panel for use in a liquid crystal projector, comprising:

two (2) pieces of transparent substrates, enclosing a liquid crystal between them; and further

at least a transparent plate, being disposed opposing to one surface of said two (2) pieces of transparent substrates, so as to define a flow channel for a liquid coolant between them, wherein

said flow channel defines a high-resistance flow channel being flat and uniform in thickness thereof, and further comprises an auxiliary flow channel lower in flow resistance than said high-resistance flow channel, being defined surrounding said high-resistance flow channel.

5. (currently amended) A liquid cooling apparatus for cooling liquid crystal panels for use in a liquid crystal projector, each panel having two (2) pieces of transparent substrates, enclosing a liquid crystal between them, with a liquid coolant circulating through each panel, comprising:

at least a transparent plate, being disposed opposing to one surface of said two (2) pieces of transparent substrates, so as to define therebetween a high-resistance flow channel being flat and uniform in thickness thereof, covering a liquid crystal panel area of said liquid crystal panel, and also a buffer portion neighboring to said flow channel, said buffer portion being coupled to one of an inlet and outlet of

said liquid crystal panel for the liquid coolant circulating through said liquid crystal panel; further

a driving means for circulating the liquid coolant through said liquid crystal panel and being connected to said buffer portion of said liquid crystal panel; and

a heat radiator means coupled to said driving means and to said liquid crystal panel for radiating heat of said liquid crystal panel, which is received in said flow channel into an outside, whereby building a closed loop liquid cooling cycle including said liquid crystal panel, said driving means and said heat radiator means.

6. (withdrawn) A liquid cooling apparatus for cooling liquid crystal panels for use in a liquid crystal projector, each panel having two (2) pieces of transparent substrates, enclosing a liquid crystal between them, with a liquid coolant, comprising:

at least a transparent plate, being disposed opposing to one surface of said two (2) pieces of transparent substrates, so as to define therebetween a high-resistance flow channel being flat and uniform in thickness thereof, covering a liquid crystal panel area of said liquid crystal panel, and also an auxiliary flow channel lower in flow resistance than said high-resistance flow channel, being defined surrounding said flow channel; further

a driving means for the liquid coolant, connected to said buffer portion of said liquid crystal panel; and

a heat radiator means for radiating heat of said liquid crystal panel, which is received in said flow channel into an outside, whereby building a liquid cooling cycle.

7. (withdrawn) A liquid crystal projector, comprising:

a light source;

an optical element for changing the light from said light source into a parallel light, to be divided into three (3) light beams;

three (3) kinds of liquid crystal panels for transmitting the three (3) light beams divided by said optical element therethrough, so as to modulate intensity

thereof;

an optical synthesizing means for synthesizing the three (3) light beams, passing through said three (3) kinds of liquid crystal panels, to be modulate intensity thereof;

a projection means for projecting the three (3) light beams, which are synthesized by said optical synthesizing means; and

a liquid cooling cycle, including a pump and a radiator therein, for circulating a liquid coolant within said three (3) kinds of liquid crystal panels, so as to conduct cooling thereof, wherein

each of said three (3) kinds of liquid crystal panels defines a flow channel for the liquid coolant between a surface of said liquid crystal panel and a transparent member to be disposed opposing thereto, respectively, and further, said flow channel includes a first flow channel being flat and uniform in thickness thereof, covering a liquid crystal panel area of said liquid crystal panel, and also a second flow channel provided on a one of upstream side and downstream side of said first flow channel, having flow resistance higher than that in said first flow channel.

8. (withdrawn) The liquid crystal projector, as described in the claim 7, wherein said liquid crystal panel further comprises a buffer portion neighboring to said second flow channel, in addition to said second flow channel.

9. (withdrawn) A liquid crystal panel for use in a liquid crystal projector, comprising:

two (2) pieces of transparent substrates, enclosing a liquid crystal between them; and further

at lease a transparent plate, being disposed opposing to one surface of said two (2) pieces of transparent substrates, so as to define a flow channel for a liquid coolant between them, wherein

said flow channel defines a first flow channel being flat and uniform in thickness thereof, within an area covering a liquid crystal area of said liquid crystal

panel, and further comprises a second flow channel neighboring to a one of upstream side and downstream side of said high-resistance flow channel, having flow resistance higher than that in said first flow channel.

10. (withdrawn) The liquid crystal panel for use in a liquid crystal projector, as described in the claim 9, wherein said liquid crystal panel further comprises a buffer portion neighboring to said second flow channel, in addition to said second flow channel.

11. (withdrawn) A liquid cooling apparatus for cooling liquid crystal panels for use in a liquid crystal projector, each panel having two (2) pieces of transparent substrates, enclosing a liquid crystal between them, with a liquid coolant, comprising:

at least a transparent plate, being disposed opposing to one surface of said two (2) pieces of transparent substrates, so as to define therebetween a first flow channel being flat and uniform in thickness thereof, covering a liquid crystal panel area of said liquid crystal panel, and also a second flow channel on a one of upstream side and downstream side of said first flow channel, being higher in flow resistance than that in said first flow channel; further

a driving means for the liquid coolant, connected to said first and said second flow channels of said liquid crystal panel; and

a heat radiator means for radiating heat of said liquid crystal panel, which is received in said first and said second flow channels into an outside, whereby building a liquid cooling cycle.

12. (withdrawn) The liquid cooling apparatus for cooling liquid crystal panels for use in a liquid crystal projector, as described in the claim 11, wherein said liquid crystal panel further comprises a buffer portion neighboring to said second flow channel, in addition to said second flow channel.